CLAIMS

1. A method of decoding a one-point algebraic geometric code of dimension k and length n, in which, in order to identify the position of the errors in a received word, the syndromes matrix S, of size $(n-k)$ x $(n-k)$, is defined, of which the elements S_{ij} of each line i are calculated, for j between 1 and $w(i)$, where the boundary w is a decreasing function, using the syndrome $\underline{s}$ of the received word,

said method being characterized in that it comprises matrix construction steps numbered by u, during which matrices S^u are constructed starting with $S^1 = S$, and in that each matrix S^u for $u > 1$ is obtained from the matrix S^{u-1} by performing :

- where appropriate, permutations on the columns of the matrix S^{u-1}, then
- linear manipulations involving the line of index u of the matrix so obtained,

and in that the construction of matrices terminates when:

- either $S^u{}_{uj} = 0$ for all j between 1 and $w(u)$,
- or there is an integer $u^* \leq (u\text{-}1)$ such that $S^{u^*}{}_{u^*j} = 0$ for all j between 1 and $w(u)$.

2. A method of decoding a one-point algebraic geometric code of dimension k and length n, in which, in order to identify the position of the errors in a received word, the syndromes matrix S, of size $(n-k)$ x $(n-k)$, is defined, of which the elements S_{ij} of each line i are calculated, for j between 1 and $w(i)$, where the boundary w is a decreasing function, using the syndrome $\underline{s}$ of the received word,

said method being characterized in that it comprises matrix construction steps numbered by u, during which matrices S^u are constructed starting with $S^1 = S$, and in that each matrix S^u for $u > 1$ is obtained from the matrix S^{u-1} by performing :

- where appropriate, permutations on the columns of the matrix S^{u-1}, then
- linear manipulations of the line of index u of the matrix so obtained,

and in that the last step is:

- either the step of number $u = \lambda$, if an integer λ is determined such that $S^{\lambda}_{\lambda j} = 0$ for all j between 1 and $w(\lambda)$,

- or the step of number $u = (\lambda -1)$, if an integer λ and an integer u^* are determined, with $u^* < \lambda$, such that $S^{u^*}_{u^*j} = 0$ for all j between 1 and $w(\lambda)$.

3. A decoding method according to claim 1 or claim 2, characterized in that the number of lines of each matrix S^u is cut off at u_{max}, where u_{max} is the smallest integer i for which $w(i)$ is less than i.

4. A decoding method according to any one of claims 1 to 3, characterized in that the number of columns of each matrix S^u is cut off at $w(u)$.

5. A decoding method according to any one of claims 1 to 3, characterized in that the number of columns of each matrix S^u is cut off at $w(\mu_D)$ for u between 1 and Duursma's minimum μ_D, and at $w(u)$ for (the case arising) u greater than μ_D.

6. An error correction device (107) for decoding a one-point algebraic geometric code of dimension k and length n, adapted to identify the position of the errors in a received word, and comprising means for defining the syndromes matrix S, of size $(n-k)$ x $(n-k)$, of which the elements S_{ij} of each line i are calculated, for j between 1 and $w(i)$, where the boundary w is a decreasing function, using the syndrome $\underline{s}$ of the received word,

said error correction device (107) being characterized in that it further comprises means for constructing matrices S^u numbered by u, with $S^1 = S$, each matrix S^u for $u > 1$ being obtained from the matrix S^{u-1} by performing :

- where appropriate, permutations on the columns of the matrix S^{u-1}, then

- linear manipulations involving the line of index u of the matrix so obtained,

and in that it comprises means for stopping the construction of the matrices when:

- either $S^u_{uj} = 0$ for all j between 1 and $w(u)$,

- or there is an integer $u^* \leq (u-1)$ such that $S^{u^*}_{u^*j} = 0$ for all j between 1 and $w(u)$.

7. An error correction device according to claim 6, characterized in that it further comprises means for cutting off the number of lines of each matrix S^u at u_{max}, where u_{max} is the smallest integer i for which $w(i)$ is less than i.

8. An error correction device according to claim 6 or claim 7, characterized in that it further comprises means for cutting off the number of columns of each matrix S^u at $w(u)$.

9. An error correction device according to claim 6 or claim 7, characterized in that it further comprises means for cutting off the number of columns of each matrix S^u at $w(\mu_D)$ for u between 1 and Duursma's minimum μ_D, and at $w(u)$ for (the case arising) u greater than μ_D.

10. A decoder (10), characterized in that it comprises:

- at least one error correction device according to any one of claims 6 to 9, and
- at least one redundancy suppression device (108).

11. Apparatus for receiving encoded digital signals (70), characterized in that it comprises a decoder according to claim 10, and in that it comprises means (106) for demodulating said encoded digital signals.

12. A computer system (70), characterized in that it comprises a decoder according to claim 10, and in that it further comprises :

- at least one hard disk, and
- at least one means (105) for reading that hard disk.

13. Non-removable data storage means, characterized in that it comprises computer program code instructions for the execution of the steps of a method according to any one of claims 1 to 5.

14. Partially or wholly removable data storage means, characterized in that it comprises computer program code instructions for the execution of the steps of a method according to any one of claims 1 to 5.

15. Computer program, characterized in that it contains instructions such that, when said program controls a programmable data processing device, said instructions lead to said data processing device implementing a method according to any one of claims 1 to 5.